

CLAIMS

What is claimed is:

- 1 1. A method of automatically configuring a port of a network element, comprising the
2 steps of:
3 discovering information that identifies or describes a second network element that is
4 coupled to a port of a first network element;
5 associating the port with a port role definition selected from a plurality of port role
6 definitions based on the discovered information;
7 retrieving zero or more configuration settings that are associated with the selected
8 port role definition; and
9 applying the zero or more configuration settings to the port.
- 1 2. A method as recited in Claim 1, wherein the step of associating a port with a port
2 role definition comprises the steps of:
3 mapping the port to a profile selected from a plurality of profiles based on the
4 discovered information; and
5 matching the profile to a port role definition.
- 1 3. A method as recited in Claim 2, wherein a profile comprises a profile identifier;
2 and one or more rules that maps one or more ports to the profile based on the discovered
3 information.
- 1 4. A method as recited in Claim 2, wherein a port role definition comprises a port
2 role definition identifier, and one or more configuration values that can be applied to a
3 port that is associated with the port role definition.
- 1 5. A method as recited in Claim 4, wherein the configuration values comprise one or
2 more configuration attributes and value pairs for the port.

- 1 6. A method as recited in Claim 4, wherein the configuration values comprise one or
2 more quality of service values for the port.
- 1 7. A method as recited in Claim 4, wherein the configuration values comprise one or
2 more lines of the configuration language of the network element.
- 1 8. A method as recited in Claim 1, wherein the discovered information comprises a
2 type identifier of the second element; and an identity identifier of the second element.
- 1 9. A method as recited in Claim 8, wherein the type identifier of the second element
2 is the capabilities TLV or platform TLV of a CDP message from the second element;
3 wherein the identity identifier of the second element is the sysName TLV of a CDP
4 message from the second element.
- 1 10. A method as recited in Claim 1, further comprising the steps of:
2 providing the discovered information to a management application;
3 receiving zero or more configuration settings from the management application;
4 applying the configuration settings to the port.
- 1 11. A method as recited in Claim 10, wherein the additional configuration settings are
2 generated based on the discovered information.
- 1 12. A method as recited in Claim 1, wherein the first element is programmed to
2 automatically configure a selection of one or more ports from a plurality of ports.
- 1 13. A method as recited in Claim 1, wherein the steps are performed when the first
2 network element boots up.

1 14. A method as recited in Claim 1, wherein the steps are performed for a particular
2 port of the first network element when said port becomes active after a period of
3 inactivity.

1 15. A method as recited in Claim 1, wherein the steps are performed at a specified
2 periodic time interval.

1 16. A method as recited in Claim 1, wherein the step of discovering information
2 comprises the steps of:
3 querying a Cisco Discovery Protocol (CDP) cache of the first element to obtain a
4 Capabilities type-length-value (TLV) and a sysName TLV .

1 17. A method as recited in Claim 2, wherein the profile further comprises a counter
2 indicating a number of ports to which the profile is currently mapped.

1 18. A method as recited in Claim 2, wherein the profile further comprises a counter
2 indicating a number of ports to which the profile is currently mapped, and wherein the steps
3 of retrieving and applying are performed only when the counter is less than or equal to one.

1 19. A method as recited in Claim 1, wherein the first network element is a switch or
2 router.

1 20. A method as recited in Claim 1, wherein the second network element is a personal
2 computer, phone, router, server, or storage device.

1 21. A method as recited in Claim 1, wherein the step of discovering is performed by a
2 protocol selected from the set consisting of Cisco Discovery Protocol, Network-Based
3 Application Recognition, Netflow, SSG, 802.1x, and Simple Network Management Protocol.

1 22. A method as recited in Claim 1, wherein the step of discovering is performed by
2 Simple Network Management Protocol, and wherein the discovered information comprises a
3 sysDescr object and sysObjectID of a MIB of the second network element.

1 23. A method of automatically configuring one or more ports of a packet data router,
2 comprising the computer-implemented steps of:
3 discovering device type information about a port of the router, using a discovery
4 protocol;
5 based on the device type information, and a stored mapping, selecting a port role
6 definition from among a plurality of stored port role definitions, wherein each
7 of the port role definitions is associated with one or more stored configuration
8 commands that reflect an abstract role played by the port when connected to
9 another device;
10 receiving zero or more stored network device configuration commands that are
11 associated with the port role definition;
12 applying the received configuration commands to the port.

1 24. A computer-readable medium carrying one or more sequences of instructions for
2 automatically configuring a port of a network element, which instructions, when executed by
3 one or more processors, cause the one or more processors to carry out the steps of:
4 discovering information that identifies or describes a second network element that is
5 coupled to a port of a first network element;
6 associating the port with a port role definition selected from a plurality of port role
7 definitions based on the discovered information;
8 retrieving zero or more configuration settings that are associated with the selected
9 port role definition; and
10 applying the zero or more configuration settings to the port.

1 25. A computer-readable medium as recited in Claim 1, wherein the instructions for
2 performing the step of associating a port with a port role definition comprise instructions
3 for performing the steps of:

4 mapping the port to a profile selected from a plurality of profiles based on the
5 discovered information; and
6 matching the profile to a port role definition.

1 26. A computer-readable medium as recited in Claim 25, wherein a profile comprises
2 a profile identifier; and one or more rules that maps one or more ports to the profile based
3 on the discovered information.

1 27. A computer-readable medium as recited in Claim 25, wherein a port role
2 definition comprises a port role definition identifier, and one or more configuration
3 values that can be applied to a port that is associated with the port role definition.

1 28. A computer-readable medium as recited in Claim 27, wherein the configuration
2 values comprise one or more configuration attributes and value pairs for the port.

1 29. A computer-readable medium as recited in Claim 27, wherein the configuration
2 values comprise one or more lines of the configuration language of the network element.

1 30. A computer-readable medium as recited in Claim 27, wherein the configuration
2 values comprise one or more quality of service values for the port.

1 31. A computer-readable medium as recited in Claim 24, wherein the discovered
2 information comprises a type identifier of the second element; and an identity identifier
3 of the second element.

1 32. A computer-readable medium as recited in Claim 31, wherein the type identifier
2 of the second element is the capabilities TLV or platform TLV of a CDP message from
3 the second element; wherein the identity identifier of the second element is the sysName
4 TLV of a CDP message from the second element.

1 33. A computer-readable medium as recited in Claim 24, further comprising
2 instructions for performing the steps of:
3 providing the discovered information to a management application;
4 receiving zero or more configuration settings from the management application;
5 applying the configuration settings to the port.

1 34. A computer-readable medium as recited in Claim 33, wherein the additional
2 configuration settings are generated based on the discovered information.

1 35. A computer-readable medium as recited in Claim 24, wherein the first element is
2 programmed to automatically configure a selection of one or more ports from a plurality
3 of ports.

1 36. A computer-readable medium as recited in Claim 24, wherein the instructions are
2 performed when the first network element boots up.

1 37. A computer-readable medium as recited in Claim 24, wherein the instructions are
2 performed for a particular port of the first network element when said port becomes
3 active after a period of inactivity.

1 38. A computer-readable medium as recited in Claim 24, wherein the instructions are
2 performed at a specified periodic time interval.

1 39. A computer-readable medium as recited in Claim 24, wherein the instructions for
2 performing the step of discovering information comprise instructions for performing the
3 steps of:

4 querying a Cisco Discovery Protocol (CDP) cache of the first element to obtain a
5 Capabilities type-length-value (TLV) and a sysName TLV .

1 40. A computer-readable medium as recited in Claim 25, wherein the profile further
2 comprises a counter indicating a number of ports to which the profile is currently
3 mapped.

1 41. A computer-readable medium as recited in Claim 25, wherein the profile further
2 comprises a counter indicating a number of ports to which the profile is currently mapped,
3 and wherein the steps of retrieving and applying are performed only when the counter is less
4 than or equal to one.

1 42. A computer-readable medium as recited in Claim 24, wherein the first network
2 element is a switch or router.

1 43. A computer-readable medium as recited in Claim 24, wherein the second network
2 element is a personal computer, phone, router, server, or storage device.

1 44. A computer-readable medium as recited in Claim 24, wherein the instructions for
2 performing the step of discovering comprise instructions for performing the step of
3 discovering by a protocol selected from the set consisting of Cisco Discovery Protocol,
4 Network-Based Application Recognition, and Simple Network Management Protocol.

1 45. A computer-readable medium as recited in Claim 24, wherein the instructions for
2 performing the step of discovering comprise instructions for performing the step of
3 discovering by Simple Network Management Protocol, and wherein the discovered
4 information comprises a sysDescr object and sysObjectID of a MIB of the first network
5 element.

1 46. An apparatus for automatically configuring a port of a network element, comprising:
2 means for discovering information that identifies or describes a second network
3 element that is coupled to a port of a first network element;
4 means for associating the port with a port role definition selected from a plurality of
5 port role definitions based on the discovered information;
6 means for retrieving zero or more configuration settings that are associated with the
7 selected port role definition; and
8 means for applying the zero or more configuration settings to the port.

1 47. An apparatus for automatically configuring a port of a network element,
2 comprising:
3 a network interface that is coupled to the data network for receiving one or more packet
4 flows therefrom;
5 a processor;
6 one or more stored sequences of instructions which, when executed by the processor,
7 cause the processor to carry out the steps of:
8 discovering information that identifies or describes a second network element that
9 is coupled to a port of a first network element;
10 associating the port with a port role definition selected from a plurality of port
11 role definitions based on the discovered information;
12 retrieving zero or more configuration settings that are associated with the selected
13 port role definition; and
14 applying the zero or more configuration settings to the port.